

Data Transmission System Based on Combined Shortwave-Satellite Transmission

This invention relates to a system for transmitting information to a user via a wideband satellite transmission channel in broadcast operation.

A system of this type is known (Connect magazine, July 1997, p. 74). With this system, information, from the Internet for example, can be transmitted to users very rapidly at high transmission rates. The transmission takes place via television satellites (transponders). A request for desired information by the user takes place as usual via a telephone line.

Many users cannot use telephone lines for making the request, for example when the user is on a ship or is using an aircraft, or also is so far from telephone networks that even UHF or VHF communications systems such as mobile telephony devices cannot be utilized.

It is an object of this invention to provide reception of Internet information via a satellite transmission channel in broadcast operation even for those users who have no opportunity for such a connection to the Internet by line for example, and those who have only limited opportunities of shortwave communication available to them.

This object is achieved according to principles of the invention in that users are connected to the Internet via a shortwave radio path on which data are transmitted according to the known TCP/IP protocol.

The invention takes advantage of the knowledge that such shortwave radio paths in a range of, for example, 1.5 to 30 MHZ can be used over vast distances on the entire globe. Such shortwave radio connections, in contrast to wire telephone lines or mobile telephony connections working in the VHF/UHF frequency range, are often unstable, provide very low transfer rates (< 3 Kbit/s) and are most commonly operated in simplex mode. Use of the internationally standardized TCP/IP protocol currently used for data transmission in worldwide communications networks, such as the Internet, which operates in full duplex mode and, as is described for example in the book "Internetworking With TCP/IP" by Douglas E. Comer, Prentice Hall,

Englewood Cliffs, New Jersey 07632, has so far been withheld from the shortwave transmission medium. For the purpose of this invention, this TCP/IP protocol is modified and adapted so that it can also be used for the chronologically sequential alternating, forward and backward connection, common in the shortwave range. Such a shortwave connection transmitting data according to the TCP/IP protocol is therefore also suitable for requesting data on the Internet. An Internet user on a ship who has a shortwave transmitter/receiver device with these properties can, therefore, at any time, for example from an Internet provider, request a specific Internet content via his shortwave connection, and this will then be directly transmitted to him via a wideband satellite transmission channel. Although such shortwave radio connections are relatively narrowband, the opportunity is hereby provided for the first time for even users who do not have any opportunity for a wire connection to an Internet service provider to make use of the possibility of an Internet information transmission with high transfer rates via a satellite transmission channel.

The invention is described in further detail below with reference to a schematic drawing, based on an exemplary embodiment.

The figure shows an Internet service provider 1 that makes available content from the Internet 2 via a satellite transmission path 3, 4, 5 to various users A and B, at a high transmission rate. A suitable decoder 7 is provided in a computer 6 of each user. The data transmission via the satellite transmission path takes place according to the TCP/IP protocol.

At each user station A and B, a shortwave transmitter/receiver 8 is provided that is connected with a shortwave transmitter/receiver station 9 of a base station Z having Internet access. Suitable shortwave devices 8 and 9 are the XK2000 devices of Rohde & Schwarz, as described, for example, in the data sheet "HF Transceiver Family XK2000". The computers 6 and 10 that control the devices 8 and 9 provide a control program that corresponds to the TCP/IP protocol and is adapted only to the special requirements of a shortwave connection. Thus, the shortwave connection between the devices 8 and 9 functions, exactly as does the satellite transmission path, according to the TCP/IP protocol, and is thus directly suitable for access from stations A and B to the Internet 2, via Z.

Rather than transmitting large quantities of data over the base station Z via shortwave to the user station A and/or B, this information can be deposited for the user in a so-called mailbox on the Internet. The user stations A and/or B can load this data to their computers via the rapid satellite connection. Both notification of the user stations A and/or B of the deposited message and request for the deposited information on the Internet take place via the shortwave medium.

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